AMENDMENT TO THE CLAIMS

1. (currently amended) A portable battery charging system tester configured to test a battery charging system of a vehicle, comprising:

cabling configured to electrically couple to a battery of the vehicle and provide an electrical connection to the battery;

a display configured to display information;

a microprocessor configured to:

perform a battery test on the battery through the electrical connection to the battery, wherein the battery test is a function of a measured battery parameter and a batter rating;

perform a starter test on a starter of the vehicle through the electrical connection to the battery which determines starter condition, wherein the starter test is a function of a measured starter parameter and the measured batter parameter;

perform a charging system test on a charging system of the vehicle through the electrical connection to the battery which determines charging system condition, wherein the charger system test is a function of voltages of the vehicle measured with an engine of the vehicle operating at a plurality of RPM values;

provide outputs related to the battery test, starter test, and charger system test; and

wherein the tester is portable and moveable between plurality of vehicles.

2. (original) The apparatus of claim 1 including a user input configured to receive a battery rating from a user.

3. (original) The apparatus of claim 2 wherein the user input is further configured to receive a rating standard selection from the user.

4. (original) The apparatus of claim 3 wherein the rating standard selection comprises an SAE standard.

5. (original) The apparatus of claim 3 wherein the rating standard selection comprises a DIN standard.

6. (original) The apparatus of claim 3 wherein the rating standard selection comprises an IEC standard.

7. (original) The apparatus of claim 3 wherein the rating standard selection comprises an EN standard.

8. (original) The apparatus of claim 3 wherein the rating standard selection comprises a JIS standard.

9. (original) The apparatus of claim 1 wherein the battery test is based upon conductance.

10. (original) The apparatus of claim 1 wherein the battery test is based upon resistance.

11. (original) The apparatus of claim 1 wherein the battery test is based upon impedance.

12. (original) The apparatus of claim 1 wherein the battery test is based upon admittance.

13. (original) The apparatus of claim 1 wherein an operator is instructed to start an engine of the vehicle for the starter test.

14. (previously presented) The apparatus of claim 1 wherein one output comprises cranking voltage.

15. (previously presented) The apparatus of claim 1 wherein one output comprises an output "good battery".

16. (previously presented) The apparatus of claim 1 wherein one output comprises an output "good but recharge battery".

17. (previously presented) The apparatus of claim 1 wherein one output comprises an output "charge and retest battery".

18. (previously presented) The apparatus of claim 1 wherein one output comprises an output "replace battery".

19. (previously presented) The apparatus of claim 1 wherein one output comprises an output "bad cell-replace battery".

20. (original) The apparatus of claim 1 wherein the charging system test includes measuring a voltage when an engine of the vehicle is revved and no vehicle loads are applied.

21. (original) The apparatus of claim 1 wherein the charging system test includes measuring a voltage when the engine is idle and a vehicle load is applied.

22. (original) The apparatus of claim 1 wherein the charging system test includes measuring a voltage when the engine is revved and a vehicle load is applied.

23. (original) The apparatus of claim 1 wherein the charging system test includes measuring AC voltage ripple.

24. (original) The apparatus of claim 1 including a user input configured to receive a temperature.

25. (original) The apparatus of claim 1 wherein the battery test is a function of a temperature.

26. (original) The apparatus of claim 1 wherein the microprocessor is configured to determine if surface charge exists on the battery.

27. (original) The apparatus of claim 26 wherein the microprocessor prompts an operator to turn on headlights of the vehicle based upon a surface charge determination.

28. (original) The apparatus of claim 1 wherein an output is printed based upon a test.

29. (previously presented) The apparatus of claim 1 including a display configured to display the outputs.

30. (previously presented) The apparatus of claim 1 wherein an output comprises battery rating.

31. (previously presented) The apparatus of claim 1 wherein an output comprises measured battery capacity.

32. (previously presented) The apparatus of claim 1 wherein an output comprises voltage.

33. (previously presented) The apparatus of claim 1 wherein an output comprises voltage during cranking.

34. (previously presented) The apparatus of claim 1 wherein an output comprises idle voltage.

35. (previously presented) The apparatus of claim 1 wherein an output comprises load voltage.

36. (previously presented) The apparatus of claim 1 wherein an output is indicative of a presence of excessive diode ripple voltage.

37. (original) The apparatus of claim 1 wherein AC and DC voltages are recorded.

38. (original) The apparatus of claim 1 wherein a voltage across the battery is recorded.

39. (previously presented) The apparatus of claim 1 wherein the battery test is used to prevent incorrectly identifying an output from the charging system test as indicating that the charging system as being faulty.

40. (original) The apparatus of claim 1 including an analog to digital converter.

41. (original) The apparatus of claim 1 including an amplifier configured to couple across a positive and a negative terminal of the battery.

42. (original) The apparatus of claim 1 including an amplifier coupled to the battery through a capacitor.

43. (original) The apparatus of claim 1 including a battery voltage scaling circuit.

44. (cancelled)

45. (original) The apparatus of claim 1 wherein the charging system test is a function of the battery test.

46. (cancel)

47. (original) The apparatus of claim 1 including DC voltage sensor adapted to measure a DC voltage of the battery and an AC voltage ripple detector adapted to measure an AC ripple voltage across the battery.

48. (original) The apparatus of claim 1 wherein the microprocessor is further adapted to measure a starting voltage across the battery while a starting motor of the vehicle is actuated to start an engine of the vehicle.

49. (original) The apparatus of claim 1 wherein the microprocessor provides an output indicating that the battery requires charge if a starting voltage is low and the battery test indicates that the battery is discharged.

50. (previously presented) The apparatus of claim 1 wherein the microprocessor provides a cranking voltage low output if the starting voltage is low and the battery test shows that the battery is fully charged.

51. (previously presented) The apparatus of claim 1 wherein the microprocessor provides a cranking voltage normal output if a starting voltage is normal and the battery test shows that the battery is fully charged.

52. (original) The apparatus of claim 1 wherein the microprocessor measures a steady state battery voltage with the engine off, a battery voltage with the engine revved, a battery voltage with the engine idling and a load applied to the battery, and a battery voltage with this engine revved and a load applied to the battery.

53. (original) The apparatus of claim 1 wherein the microprocessor is adapted to receive an input indicating that the vehicle contains a diesel engine and wherein the microprocessor waits for glow plugs of the diesel engine to warm up and charging to start.

54. (original) The apparatus of claim 23 wherein an AC ripple voltage more than about 130 mV indicates a faulty diode or stator in the charging system.

55. (canceled)

56. (previously presented) The apparatus of claim 1 wherein the battery test does not include a load test.

Claims 57-108 (canceled)

109. (currently amended) A portable battery charging system tester, comprising:

a user input configured to receive an input from an operator;

a display configured to display an output to the operator;

an electrical connection configured to electrically couple to a battery of a vehicle;

an analog to digital converter configured to provide a digital output related to voltages measured through the electrical connection to the battery;

a microprocessor connected to the user input display and analog to digital converter configured to receive information related to a voltage measured through the electrical connection to the battery during starting of an engine

of the vehicle, a voltage during revving of the engine of the vehicle, and a temperature and further configured to perform a starter test on a starter of the vehicle which determines starter condition as a function of a measured starter parameter and of a battery test and a charging system test on the charging system of the vehicle which determines charging system condition which is a function of voltages of the vehicle measured with the engine of the vehicle operating at a plurality of RPM values; and

wherein the battery charging system tester is portable and moveable between a plurality of vehicles.

110. (canceled).

111. (original) The apparatus of claim 109 wherein the starter test is a function of a battery test.

112. (original) The apparatus of claim 109 wherein the charging system test is a function of a battery test.